DRIP DISTRIBUTION SYSTEM

Description: A small-diameter flexible piping network with emitters to discharge filtered effluent into the root zone of the receiving soils. The system is composed of a septic tank, (optional pretreatment system: Intermittent sand filter /Recirculating gravel filter, Extended Treatment Package System), filtering system (cartridge, or disk filters), a dosing system and process controller. Typical components include a 1,000 gallon septic tank and a 1,000 gallon pump tank, (optional pretreatment system), an effluent dosing pump, flushable disk filter, a flow meter, a programmable logic controller, and a network of shallow, self cleaning drip irrigation lines.

Conditions of Approval.

1. Drip distribution drainfields shall only be installed at locations that meet the criteria in the site suitability subsection of the rules (58.01.03.008.02 and 58.01.03.013.). The effective soil depths that are established for alternative pretreatment systems may be applied to drip distribution systems (when pretreatment systems are used).

Design.

1. Application areas up to 2 ft^2/ft of drip irrigation line may be used.
2. Drip lines may be placed on a minimum of two-foot centers.
3. Drip lines are placed directly in native soil at a depth of 6 to 18 inches with a minimum final cover of 12 inches. The design application rate is based on the most restrictive soil type encountered within two feet of the drip lines.
4. Septic tank effluent is required to be filtered with a 100-micron or smaller disk filter prior to discharge into the drip piping system.
5. Drip laterals are flushed once every two weeks to prevent biofilm and solids build up in the piping network. Minimum flushing velocity is 2 feet/second at the return ends of the distribution lines and in the drip irrigation tubing during field flush cycles and long enough to fill all lines and achieve several pipe volume changes in each lateral.
6. Minimum of two vacuum relief valves per zone. Valves are located at the highest points on both the distribution and return manifolds. Vacuum relief valves are located in a valve box, adequately drained, and insulated to prevent freezing.
7. Pressure regulators/pressure compensators are to be used on sloped installations. Pressure is to be between 25 and 40 psi. Pressure regulators/pressure compensators are located at the manifold of each zone where varying topographies exist. Pressure compensating emitters must be used on sloped installations.
8. Return manifold is required to drain back to the septic tank.
9. Timed dosing is required. Timed or event counted backflushing of the filter is required.
10. Filters, flush valves, and pressure gauge may be placed in a head works (between pump chamber and drip field). Each component is required to be insulated to prevent freezing.
11. System must be designed by an Idaho licensed professional engineer.

DRIP DISTRIBUTION SYSTEM (Cont'd)

Construction.

1. No wet weather installation. Excavation and grading are to be completed before installation of the subsurface drip system. Drip systems may not be installed in unsettled fill material.

2. No construction activity or heavy equipment may be operated on the drainfield area other than minimum to install the drip system. Do not park or store materials on drainfield area.

3. Horizontal spacing between drip lines shall be as specified and installed at the depth specified. Note for freezing conditions: the bottom drip line must be higher than the supply and return line elevation at the dosing tank.
4. All PVC pipe and fittings shall be PVC sch 40 type 1 rated for pressure applications. All glued joints shall be cleaned and primed with purple (dyed) PVC primer prior to being glued.
5. All cutting of PVC pipe, flexible PVC and/or drip tubing shall be accomplished with pipe cutters. Sawing of PVC, flexible PVC and/or drip tubing shall be followed by cleaning all shavings or sawing shall not be allowed.
6. All open PVC pipes, flexible PVC and/or drip tubing in the work area shall have the ends covered with duct tape during storage and construction to prevent construction debris and insects from entering the pipe. Prior to gluing all glue joints shall be inspected for and cleared of construction debris.
7. Dig the return header ditch along a line marked on the ground and back to the septic tank. Start the return header at the farthest end from the dosing tank. The return line must slope back to the treatment tank or septic tank.
8. Prior to start up of the drip distribution system the air release valves shall be removed and each zone in the system shall be flushed as follows:
   A. Using an appropriate length of flexible PVC pipe with a male fitting attached to the air release connection to direct the flushing away from the construction area,
   B. Flush the zone with a volume of water (clean water to be provided by contractor) equal to 1.5 times the volume of the pipes from the central unit to the air release valve or the equivalent of five minutes of flushing, and
   C. Repeat this procedure for each zone (the flushing of the system is accomplished by manual override of the control panel by the manufacturer or engineer.)
9. If existing septic tanks are to be used, they shall be pumped out by a commercial septic tank pumper, checked for leakage or other problems, and replaced if necessary. After the tank is emptied, the tank shall be rinsed, pumped, and refilled with clean water. Debris in the septic tank shall be kept to a minimum since it could clog the disk filters during startup. (Disk filters are not backflushed during startup as any clogging could cause incorrect rate of flow readings for the controller.)
10. Once completed, drainfield area for shallow installations (less than 12 inches) are to be capped with 6-8 inches of clean soil and suitably revegetated.

Inspection.

1. System must be inspected by an Idaho licensed professional engineer.
2. Turn on pump and check pressure at the air vacuum breaker. Pressure should be between 15 and 45 PSI.
3. Check system for leaks; record flow measurements and pressure readings at start up.

DRIP DISTRIBUTION SYSTEM (Cont'd)

Example: Suggested Design

1. Determine square feet needed for the drip distribution system. Wastewater flow in GPD is divided by the soil application rate (based on the soil classification from an on-site evaluation). The result is the ft^2 needed for the system.

   Example: three-bedroom home in C-2 soils.
   250 GPD/0.2 gal/ft^2 = 1250 ft^2

2. The system design is to use an application area of 2 ft^2 per foot of drip line. Divide the required ft^2 by the drip line application area (2 ft^2/ft) to determine the length of drip line needed for the system.

   1250 ft^2 / 2ft^2/ft = 625 ft of drip line.

3. Determine the size of pump based on GPM (step 3) and total head (step 4) necessary to deliver dose to system. Determine pumping rate by finding the total number of emitters and multiplying by the flow rate per emitter (1.32 gal/hr/emitter at 20 psi). Adjust output to GPM and add 1.5 GPM per connection for flushing to achieve 2 ft/s flushing velocity.

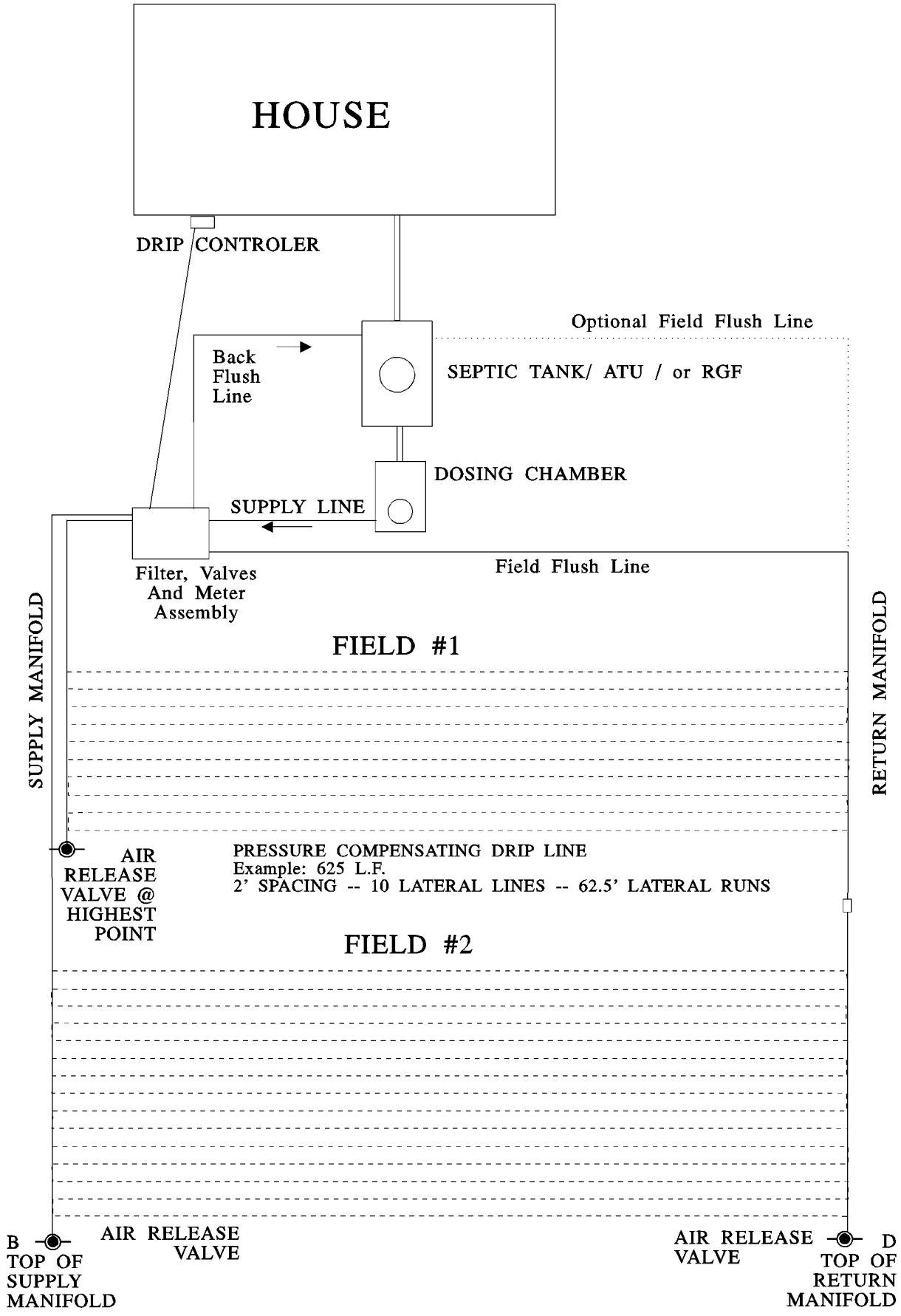
   625 ft / 2 emitters/ft = 312.5 use 315 emitters
   315 emitters x 1.32 g/hr/emitter = 415.8 gal/hr
   415.8 gal/hr / 60min/hr = 6.93 GPM or 7GPM
   10 connections at 1.5 GPM/connection = 15 GPM

4. Determine feet of head. Multiply the system design pressure (20 psi is standard, but values can be between 10 and 60 psi dependant upon drip line used) by 2.31 ft/psi to get head required to pump against.

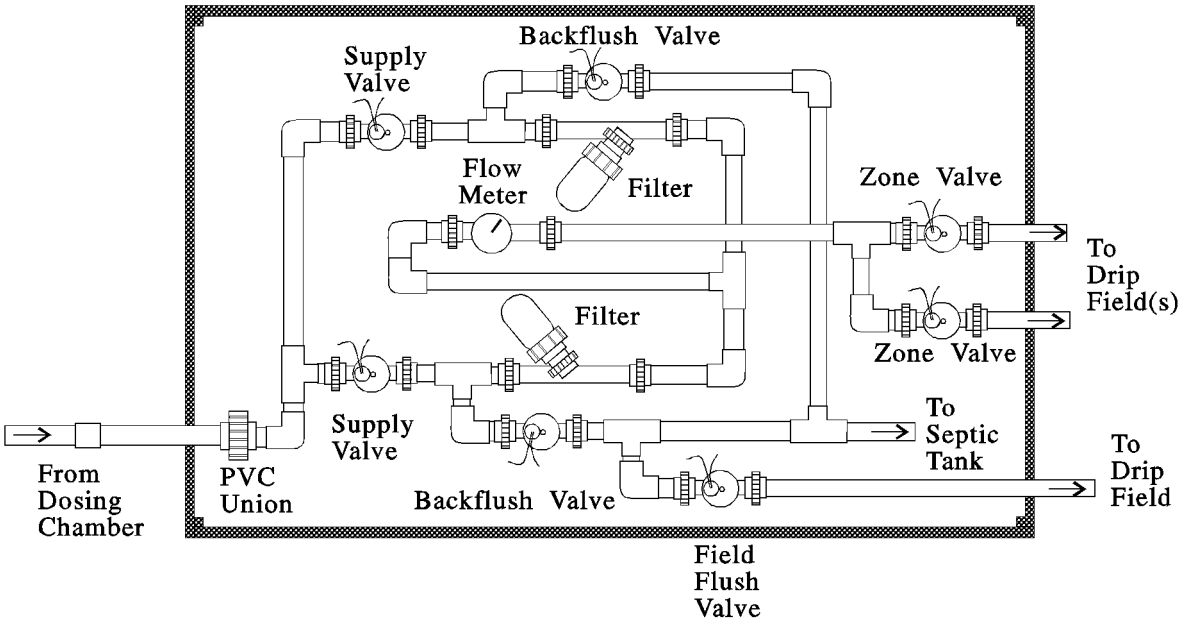
   20 psi x 2.31ft/psi = 46.2 ft of head. Add in the frictional head loss from piping.

5. Select a pump. Pump selected must achieve a minimum of 22 GPM plus the flush volume at 46.2 ft of head.

DRIP DISTRIBUTION SYSTEM

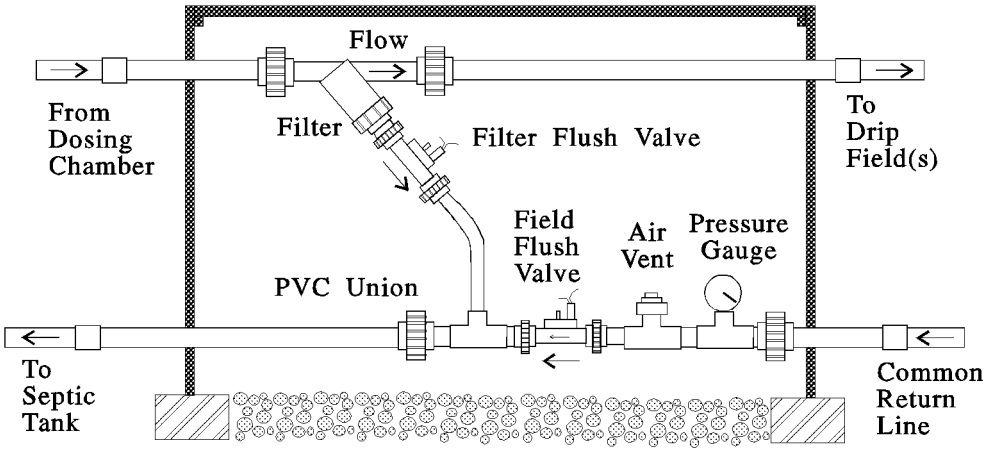


Valve Box Examples



Example of Filter, Valve and Meter Assembly.

Valve Box



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